The Rejections Under 35 U.S.C. §103

The Examiner has rejected claims 1, 3, 5, 7, and 9 under 35 U.S.C. §103 as being unpatentable over Martin et al., U.S. Patent number 5,214,768 (hereinafter Martin). The Examiner states that Martin discloses "a data processing system comprising an automated storage library ...., a controller, controller receiving ...., controller determining, controller allocating, and automated means transferring." The Examiner concedes that Martin does not disclose "identifying a specific volume or host processor unaware", but states that these shortcomings would have been obvious to one of ordinary skill in the data processing art at the time of Applicant's invention.

Applicant respectfully disagrees with the Examiner's conclusion, and provides a brief description of the present invention to assist the Examiner. Applicant has invented an automated storage library, in which the data storage devices contained therein are transparent to a host processor coupled to the library. The host processor is not coupled to the data storage devices and is unaware of how many data storage devices exist in the library, or their status. The library appears to the host processor as if it were a single peripheral storage drive coupled thereto.

A controller is coupled between the host processor and the library. The host processor specifies to the controller the storage volume and file identifiers in the library that it desires to access. In response, the controller locates the storage volume within the library, allocates one or more of the data storage devices, and instructs that the storage volume be mounted within an allocated storage device. The controller does

not notify the host processor in which data storage device the storage volume is mounted. To access data on the mounted storage volume, the host processor communicates solely with the controller, which in turn directs such communications to the appropriate data storage device. The host processor is thus relieved of any need to identify, recognize, or manage, any individual data storage device within the library. All libraries in the current art require a host processor to address a specific storage drive within the library. In turn, this requires that host processors add a unique function, or capability, to address storage drives within a library, that differs from addressing an attached peripheral storage drive not within a library. Applicant's present invention eliminates the need for this unique capability, and different addressing schemes.

In contrast, Martin discloses a mass data storage and retrieval system that provides multiple access paths between the data recorder modules and the attached host processors, and uses a module system to economically expand the library storage (col. 1, lines 59-66). The system in Martin comprises a mass information storage library, a data directory, a plurality of data recorder modules, a plurality of interface computers, and a control computer (col. 3, line 45 - col. 4, line 7). The mass information storage library consists of a plurality of data storage modules for holding data storage elements. The data directory maintains a directory of the information stored on each data storage element in the storage library. The data recorder modules receive a data storage element from the storage library and provide access to the information residing on the data storage element. The interface computers are coupled to a plurality of host computers, and provide a communication and data

interface from the mass information storage and retrieval system to the host computers. The control computer is coupled to the storage library and to the interface computers. The control computer receives a request for a specific data storage element in the storage library from an interface computer, and directs the data storage element to be loaded into a selected data recorder module (col. 3, line 64 - col. 4, line 3). The interface computer then accesses the selected data recorder module for selectively reading and/or writing data to the loaded, or mounted, data storage element (col. 4, lines 3-7).

The interface computers, or IFS tape servers as referred to in Martin, provide a direct path to the tape storage, and are accessed by the host computers (col. 5, lines 35-41). Switching subsystems allow the interface computers to be directly connected to a selected one of multiple drive subsystems, or data recorder module as specified in Martin (col. 7, lines 15-25). The interface computers receive commands and data from the host computer, and provide access between the host computer and a selected data recorder module (col. 5, lines 49-53; and col. 6, lines 25-28). When the interface computer in Martin receives a command from the host processor requesting access to a tape drive resource (or data recorder module), it requests the resource from the control computer, or control subsystem. The control computer notifies the interface computer when a data recorder module has been selected and assigned to the interface computer (col. 5, line 65 to col. 6, line 4). The interface computer then confirms to the host processor that a data recorder module has been selected, and identifies the data recorder module to the host processor.

Therein lies a fundamental difference between Martin's storage and retrieval system and Applicant's automated library. Martin provides a direct communication and data path from a host processor to a selected data recorder module, or data storage device. In Applicant's automated storage library, the host processor is not coupled to the library's storage devices, and is unaware of how many data storage devices reside in the library. In fact, the data storage devices are transparent to the host processor. Applicant's invention allows the host processor to address, and communicate, with an automated storage library, containing a plurality of data storage devices, as if the library were a single peripheral device coupled to the host processor.

Martin teaches that one of the advantages of its storage and retrieval system is that it provides global access to the peripheral devices, or tape drives, from the host computers (col. 2, lines 5-23). As stated earlier, a data channel couples the data recorder modules (tape drives) to the interface computers, and the host processors. The data channel in Martin's system includes a plurality of cross-bar switches (col. 4, lines 8-12). The cross-bar switches provide multiple paths in which a host processor can select, and/or access, a data recorder module, or tape drive (col. 4, lines 12-24). Thus, Martin's system manages the connection of tape drives, or data recorder modules, to host processors, through interface computers and switching subsystems, to provide multiple, parallel data paths between multiple host processors and multiple peripheral drives (col. 13, lines 29-48). Martin's system must maintain, and account for, the connection paths between the host processors and the storage drives, and it must maintain the status and configuration information for the storage drives (col. 14, lines 40-50).

Martin's system teaches away from Applicant's invention, since the system in Martin cannot allow the storage drives to be transparent to the host processors. Whereas Applicant's automated library allows the host processor read and write access to a storage volume by simply addressing the automated library, Martin's storage and retrieval system requires the host processor to select, and address, a specific data recorder module before accessing data from a loaded, or mounted, data storage element. By using Applicant's invention, the host processor need not know where, or in which storage device, the selected storage volume is mounted within the library. Applicant asserts that the difference between the teaching in Martin and Applicant's invention is substantial. Applicant also contends that one of ordinary skill in the art would not know the teaching of Applicant's invention, transparent library management, based on the disclosure in Martin.

The Examiner also states that "Martin does teach that the control system handles the allocation of library resources such as drives". Applicant again respectfully disagrees that Martin teaches Applicant's invention. Martin's system includes a control computer, which receives commands from a host processor, through an interface computer, requesting a specific data storage element within the storage library (col. 5, lines 63-68). In Martin, the storage library consists solely of the storage modules, or arrays, having storage cells in which to hold data storage elements. The library contains no storage devices, or data recorder modules, in which to read data from or write data to loaded, or mounted, data storage elements. The control computer directs the storage library to retrieve the selected data storage element, directs that it be loaded into the selected

data recorder module, and then notifies the interface computer, and ultimately the host processor, that the selected data storage element is loaded and ready to be accessed (col. 6, lines 1-15). The interface computer, and host processor, then takes control of the data recorder module to access the desired data (col. 6, lines 3-4).

Applicant's automated library, on the other hand, includes data storage devices within the library, and also includes a storage controller. Applicant's invention allows the host processor to access the requested data by simply addressing the automated library, without needing to address the data storage device where the selected storage volume is mounted. As stated earlier, the host processor specifies to the controller the storage volume and file identifiers in the library that it desires to access. The controller locates the storage volume within the library, allocates one of the data storage devices, and instructs that the storage volume be mounted within the allocated storage device. The controller does not notify the host processor in which data storage device the storage volume is mounted. To access data on the mounted storage volume, the host processor communicates solely with the controller, which in turn directs such communications to the appropriate data storage device.

Turning to the claims, claim 1 describes "a method for accessing data in a file stored on at least one of a plurality of removable data storage media in an automated library such that the peripheral storage drives in the library are transparent to a host processor", and recites "the host processor, unaware in which of the internal peripheral storage drives that the volume specified in the request has been mounted, read/write accessing

data in the file specified in the request". Likewise, claim 5 describes "a method for accessing data from a selected file within said automated storage library such that said storage drives are transparent to said host processor", and recites "said host processor, unaware in which of said storage drives that said specified volume has been mounted, read/write accessing data in said selected file".

In addition, claim 3 describes "an automated storage library capable of allowing access to data in a file stored on at least one of a plurality of removable data storage media therein such that peripheral storage drives in the library are transparent to a host processor", and recites "a controller for .... allowing the host processor, unaware in which of the internal peripheral storage drives that the volume specified in the request has been mounted, read/write access to data in the file specified in the request". Similarly, claim 7 describes "a data storage subsystem coupled to a host processor" and recites "an automated storage library capable of allowing access to data in a file stored on one of a plurality of removable data storage media such that peripheral storage drives in said library are transparent to said host processor", and "a controller for .... allowing said host processor, unaware in which of said peripheral storage drives that said specified volume has been mounted, read/write access to data in said selected file".

Allowable Subject Matter

The Examiner has objected to claims 2, 4, 6, and 8, as depending from a rejected base claim, but has also indicated that these claims contain allowable subject matter. Applicant agrees that the claims contain allowable subject matter, but in light of the previous arguments, believes that they depend from base claims which are also allowable. Applicant, therefore, has not rewritten claims 2, 4, 6, and 8 in independent form to include the limitations of their corresponding base claims. Instead, Applicant again requests that the Examiner reconsider claims 1, 3, 5, 7, and 9 in view of the previous arguments, withdraw the rejections, and allow all pending claims in the present application.

CONCLUSION

Applicant has not added any new claims, or amended, or cancelled, any pending claims in the present application. Thus, claims 1-9 remain in the present application. Applicant has submitted remarks supporting its belief that the Examiner's rejections have been traversed. Accordingly, Applicant submits that this application is in condition for allowance and respectfully requests allowance of all claims pending in this

application. Applicant encourages the Examiner to contact the undersigned at the phone number listed below if a phone conversation would aid in the prosecution of the present application.

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